

EQUINOX

SuperSerial™ Technology

Hardware Installation & Reference Manual

**Expandable I/O
Subsystem**

PN 560075/G
May 1998

Notice

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Document Reference Information

Document Title:	Equinox SuperSerial Technology, Hardware Installation & Reference Manual, Expandable I/O Subsystem	
Part Number:	560075/G	Date: May, 1998
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Declaration Of Conformity

According to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name: Equinox Systems Inc.

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Declares, that the products

Product Names: SuperSerial Technology
(SST) Serial I/O Products
Megaplex Serial I/O Products
ELS Ethernet Terminal Servers

Model Names: SST-2, SST-4, SST-8, SST-16,
SST-64, SST-128, CP-16, PM-8,
PM-16, MIM-1, CMX-16,
SST Modem Pool,
SSM-8, SSM-12, SSM-24,
Megaplex, Megaplex CMX
ELS-8, ELS-16

Product Options: All

Conform to the following Product Specifications:

Safety: EN 60950:1992, CSA C22.2 No:950, UL 1950
EMC: EN 55022 (CISPR22 A): 1987E,
FCC Part 15 Class A
EN 50082-1: 1992 - Generic Immunity
IEC 801-2: 1984, 8kV
IEC 801-3: 1984, 3V/m, 27-500MHz
IEC 801-4: 1988, 1kV Power &
0.5kV I/O Lines

Supplementary Information:

The products herewith comply with the requirements of the Low Voltage Directive, 73/23/EEC and the EMC Directive 89/336/EEC, including amendments by the CE-marking Directive 93/68/EEC.

May, 1998

Equinox Systems Inc.

Manual Organization

This manual is comprised of six chapters and two appendices.

Chapter 1 Overview

Chapter 1 describes the Equinox SuperSerial Technology (SST) Expandable Input/Output (I/O) Subsystem components and their various configurations.

Chapter 2 SST Adapter Card Installation & Setup

Chapter 2 describes the installation of the SST Host Controller Boards, how to setup ISA, EISA, Micro Channel and PCI Bus Systems and use of the host power "Y" cable.

Chapter 3 SST Expansion Module Installation

Chapter 3 describes how to install the Expansion Modules, the Expansion Bus Cabling, installing the PS-4 Power Supply and defines the module LEDs.

Chapter 4 SST Multiplexer Installation

Chapter 4 describes the installation of the SST Cluster Multiplexers, component wall mounting, Power Adapters and the Multiplexer Link Cable.

Chapter 5 SST Port to Device Cabling

Chapter 5 describes the cabling options that work with the SST Expandable I/O Subsystem.

Chapter 6 SST Modem Pool

Chapter 6 provides a description and the installation of a SST Modem Pool Expansion Chassis with supporting components.

Appendix A Power Defaults & Options

Appendix A provides a description of the Power Strap default and optional Power Strap configurations for ISA, EISA and PCI Adapter Cards.

Appendix B Support Procedures

Appendix B describes the steps you would follow to receive technical support and to report problems with this documentation.

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The *Equinox SuperSerial™ Technology (SST) Expandable I/O Subsystem* is a *High-speed Serial Communications Multiple Port* product. It consists of several different modular components configured in a variety of combinations to satisfy most applications. The various components are:

- *Adapter Card*
- *Expansion Modules*
- *Modem Pool Expansion Chassis*

Adapter Card

The *SST Adapter Card* (see Figure 1-1) occupies a slot in the host computer and provides the intelligent communications functions to "off-load" the CPU serial communications processing tasks. Adapter cards are available for PCI, ISA, EISA and Micro Channel bus systems and can support up to 128 ports using external *Expansion Modules*.

All *SST Adapter Cards* consist of either one or two *SuperSerial Processors (SSPs)* for controlling the flow of data through multiple communication ports. Figure 1-1 illustrates an *SST Adapter Card* containing two SSPs. This adapter card is capable of controlling the operation of up to 128 SST ports. SST 64 adapter cards contain one

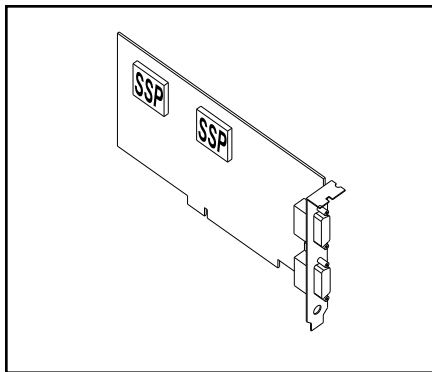


Figure 1-1. SST Adapter Card (128-port)

SSP for controlling up to 64 ports. Table 1-1 below shows the various models of *Expandable Host Controllers* available from Equinox. For your convenience Table 1-2 lists the *Non-Expandable Host Controllers* available. Non-Expandable Host Controllers are not discussed in this manual.

Model	PCI	ISA	EISA	Micro Channel	Max # Expansion Modules
SST-64	990303	990268	990270	990272	4
SST-128	990305	990269	990271	990273	8

Table 1-1. SST Expandable Host Controllers

Model	PCI	ISA	EISA	DB-9 Option	DB-25 Option	RJ-45 Option
SST-2	N/A	990286	N/A	Two DB-9 on Bezel	N/A	N/A
SST-4	990299	990283	990285	690293 Fan-Out Cable	690269 Fan-Out Cable	690268 Fan-Out Cable
SST-4/RJ	N/A	990336	N/A	N/A	N/A	Four RJ-11 on Bezel
SST-8	990301	990265	990266	690271 Fan-Out Cable	690264 Fan-Out Cable	690265 Fan-Out Cable
SST-8/RJ	N/A	990332	N/A	N/A	N/A	Eight RJ-11 on Bezel
SST-16	990326	990324	N/A	N/A	990327 Connector Panel	990328 Connector Panel

Table 1-2. Non-Expandable Products

Each *SST Adapter Card* includes software drivers and installation manuals for Microsoft Windows, Novell, DOS and UNIX operating systems on a CD ROM. EISA and Micro Channel machines must run their **setup utility** whenever an Adapter Card is added or removed from the computer. See your system documentation on how to run these utilities. *Equinox EISA (.cfg)* and *Micro Channel (.adf)* files can be found in the *disk 1* directory of the CD ROM. When booted, PCI bus systems automatically identify and configure all PCI devices connected in the system. *Equinox ISA Based Host Controllers* can be set to either specific I/O addresses or Plug and Play mode.

Expansion Modules

Peripheral devices (Such As Terminals, Printers, Modems, Bar Code Readers, Cash Registers, etc.) are connected to *Expansion Modules* located outside of the computer system. Expansion Modules are connected to the *SST Adapter Card* residing in the system via an *Expansion Bus*. The Expansion Bus provides signals from the *SST Adapter Card* to the Expansion Modules. The 64-port *SST Adapter Cards* have a single Expansion Bus accommodating from one to four Expansion Modules. The 128-port *SST Adapter Cards* have dual Expansion Buses, accommodating from one to four Expansion Modules on each bus, for a total of up to eight Expansion Modules. A basic 16-port configuration is shown in Figure 1-2.

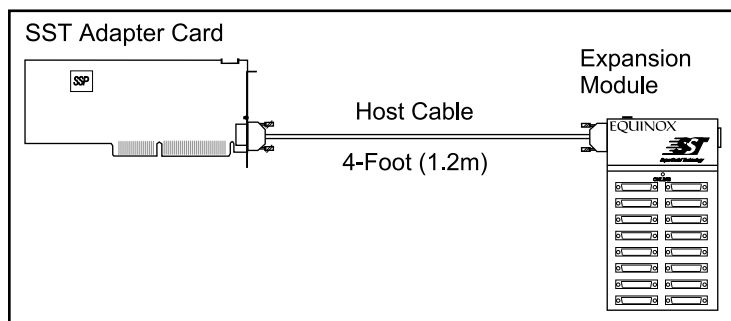


Figure 1-2. Adapter Card - Host Cable - Expansion Module

A 4-foot (1.2m) *Host Cable* is supplied for connecting the Expansion Module(s) to the Adapter Card. *Two Host Cables* are supplied with each 128-port Adapter Card. Multiple Expansion Modules mate together to permit simple expansion of the entire system without disassembling the computer.

A variety of Expansion Modules are available. Any choice of Expansion Modules may be freely intermixed on an Expansion Bus with a maximum of four Expansion Modules per bus (see Figure 1-3).

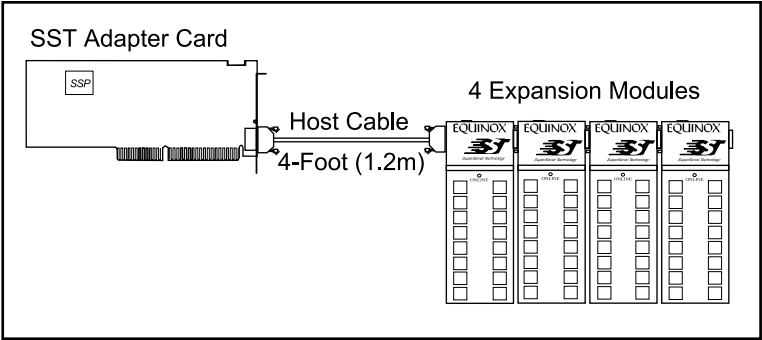


Figure 1-3. Adapter Card - Host Cable - Four Expansion Modules

Port Modules *Port Modules* are used to connect peripheral devices directly to the Expansion Bus. Both 8-port and 16-port Expansion Modules are available with a choice of DB-25 or RJ-45 connectors for RS-232 interfaces and RJ-45 connectors for RS-422 interfaces (see Table 1-3).

Model	DB-25	RJ-45	RS-422	Number of Ports	Max Speed
PM-8	990255	990254	N/A	8	230k
PM-16	990245	990232	990322	16	115K

Table 1-3. SST Port Modules

Multiplexer Interface Modules

Clusters of devices may be connected within a radius of 3,500 feet (1Km) to the Adapter Card using *Multiplexer Interface Modules* and *Cluster Multiplexers* (see Figure 1-4). In this application a 16-port Cluster Multiplexer is located near the user devices and a low-cost two-twisted-pair link (telephone type) cable is run back to the multiplexer interface module. Cluster Multiplexers are ideal for distributing devices in, as an example, a multi-building campus facility.

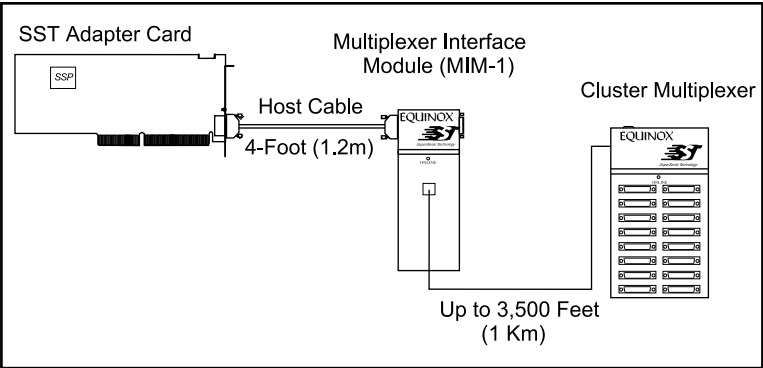


Figure 1-4. MIM-1 - Cluster Multiplexer

16-port Cluster Multiplexers (see Table 1-4) are available with either DB-25 or RJ-45 connectors. A separate MIM-1 is required for each Cluster Multiplexer used.

Model	Description	DB-25	RJ-45	Number of Ports	Max Speed
MIM-1	Multiplexer Interface Module	N/A	990233	1	N/A
CMX (110 V A C)	16-Port Cluster Multiplexer	990246	990236	16	115K
CMX (220 V A C)	16-Port Cluster Multiplexer	990279	990278	16	115K

Table 1-4. SuperSerial Multiplexer Components

Expansion Bus Cables

Expansion Modules (i.e. port Expansion Modules and Multiplexer Interface Expansion Modules) may be located further than the supplied 4-foot (1.2m) Host Cable permits by using *Expansion Bus Cables (EBCs)*. An EBC is used in place of the Host Cable. As shown in Figure 1-5, a group of four Expansion Modules are located 200 feet (61m) from the host computer using an EBC. A typical application using EBCs is when the host computer is located some distance away from the wiring closet where all the peripheral cabling exists.

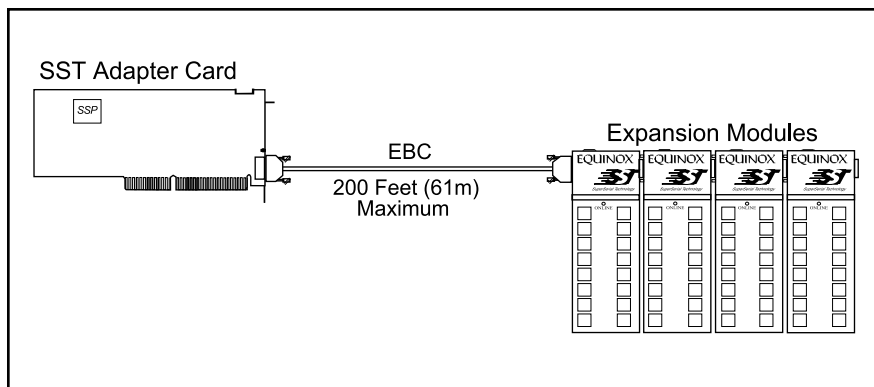


Figure 1-5. 200 Feet (61 m) EBC

EBCs are available in 25-foot (7.6m) (PN 690302) and 100-foot (30.5 m) (PN 690306) lengths. In addition to extending the distance between the SST Adapter Card and the Expansion Modules, EBCs may be used to extend the distance between adjacent Expansion Modules as shown in Figure 1-6.

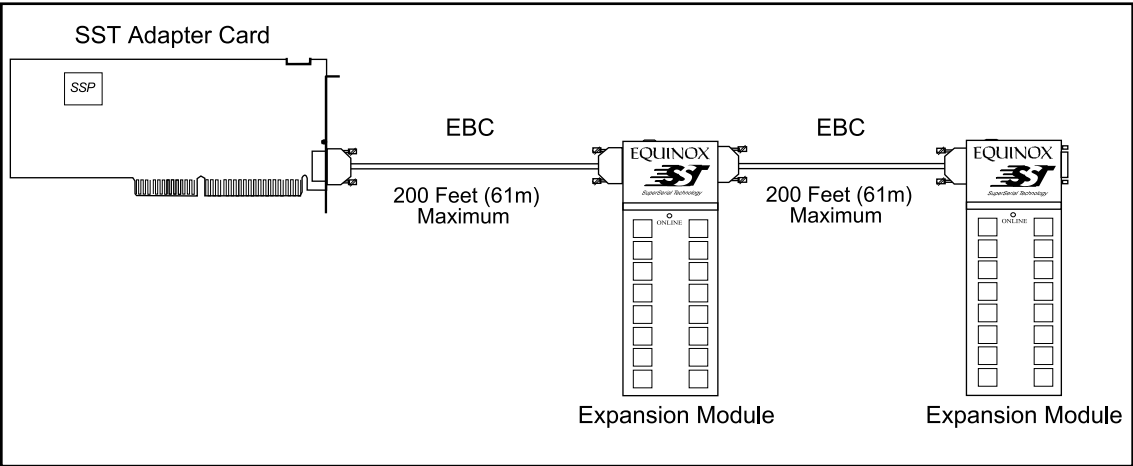


Figure 1-6. Expansion Modules Extended Distance Using EBCs



The maximum distance between the SST Adapter Card and the first Expansion Module is 200 feet (61m). The maximum distance between Expansion Modules is also 200 feet (61m).

Power Options

In simple configurations, the host Adapter Card supplies power to all Port Expansion Modules and Multiplexer Interface Expansion Modules attached to the Expansion Bus via the supplied 4-foot (1.2m) Host Cable (see Figure 1-7). Power is provided by the Adapter Card and is passed from the left to right through each directly mated module.

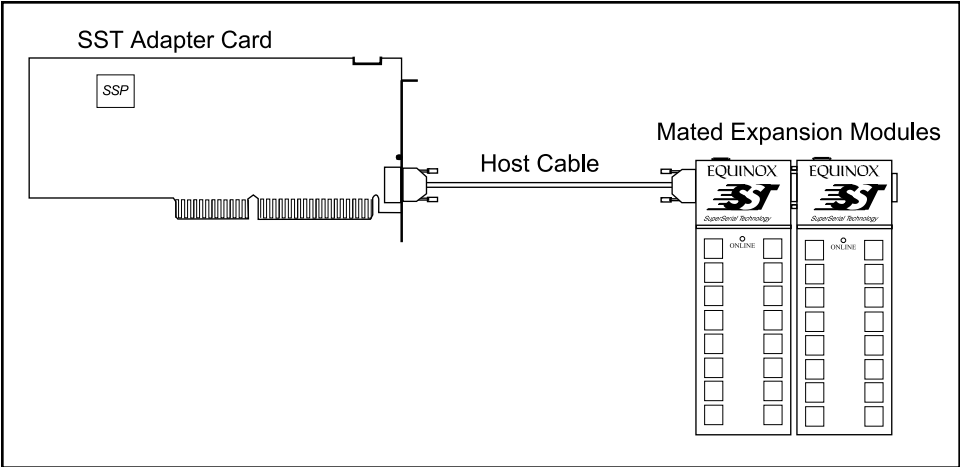


Figure 1-7. Mated Expansion Modules Draw Power from Host



Expansion Modules may draw power from the host computer through the 4-foot (1.2m) Host Cable.



Host power is available to the Expansion Modules only when the 4-foot (1.2m) Host Cable is installed and Expansion Modules are mated directly together.

The Expansion Modules attached to the Expansion Bus (**not** host bus) Cables must be externally powered using a separate power supply (PS-4, PN 990274). If an EBC is installed, this optional power supply is purchased separately and must be connected to the first (left most) module on the Expansion Bus (see Figure 1-8).

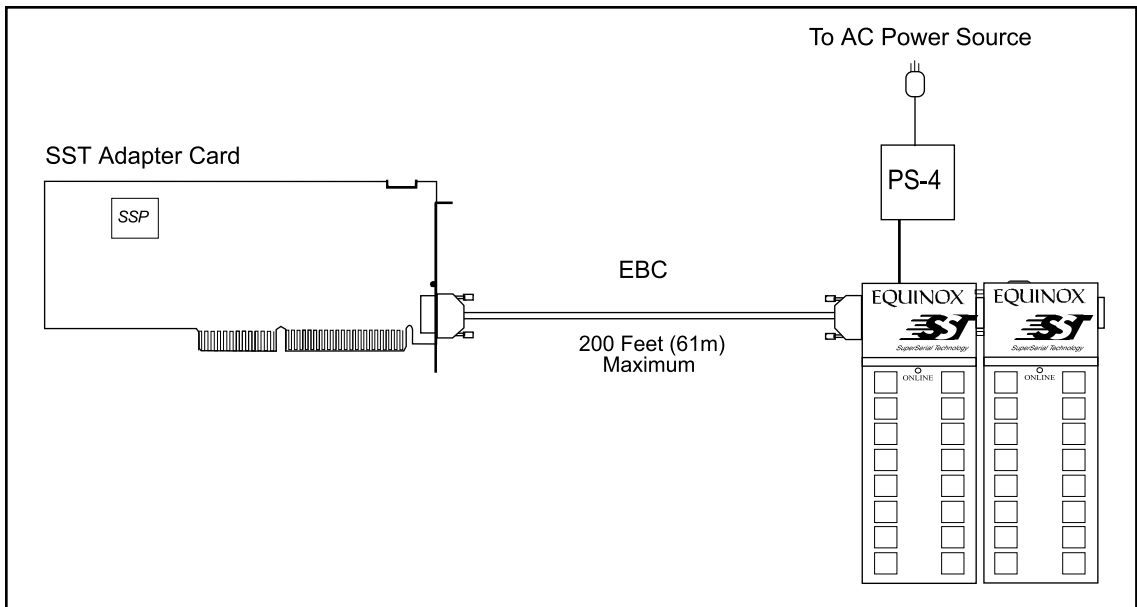


Figure 1-8. PS-4 Supplying Power to Expansion Modules

By connecting the PS-4 Power Supply to the first Module, power is no longer drawn from the host computer. All Expansion Modules directly mated to one another from the first Module are supplied power from the PS-4. The PS-4 can supply power for up to four Expansion Modules.

When Expansion Bus Cables are used between Expansion Modules, a PS-4 Power Supply is required for each Module as shown in Figure 1-9.

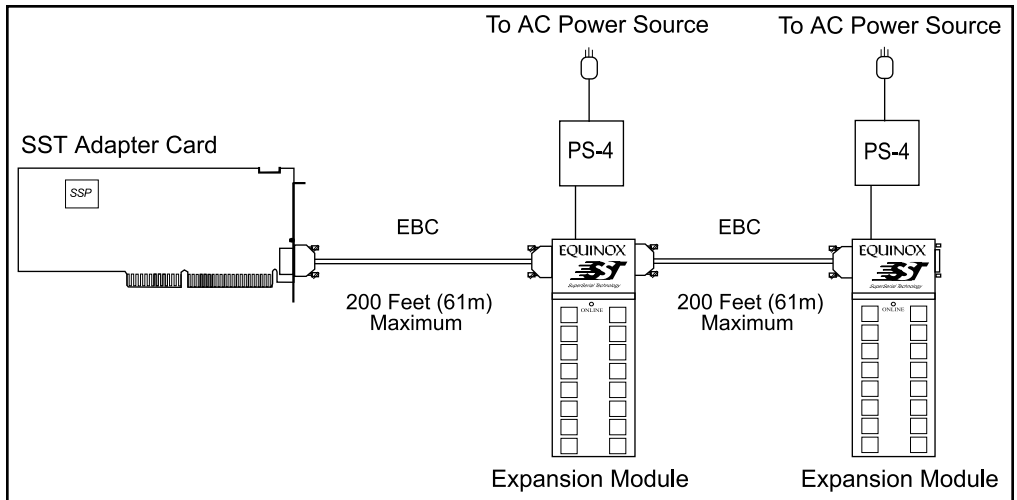


Figure 1-9. Individual PS-4s Provide Power to Modules Separated by EBCs

Cluster Multiplexers draw power from a Power Adapter, either 110v (PN 200144) or 220v (PN 200145), which plugs directly into any convenient wall outlet (see Figure 1-10).

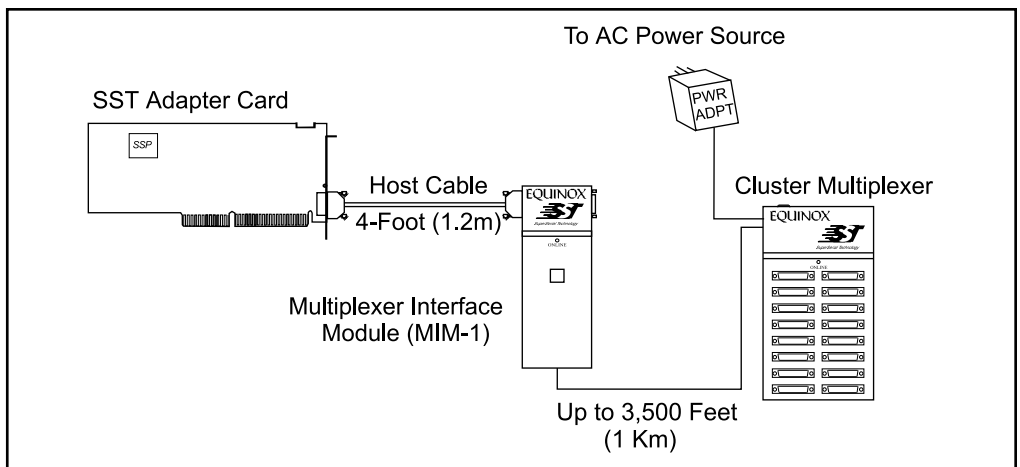


Figure 1-10. Cluster Multiplexer Draws Power From Power Adapter

Figure 1-11 illustrates a *SuperSerial Subsystem* using the maximum number of ports (128) for an Adapter Card.

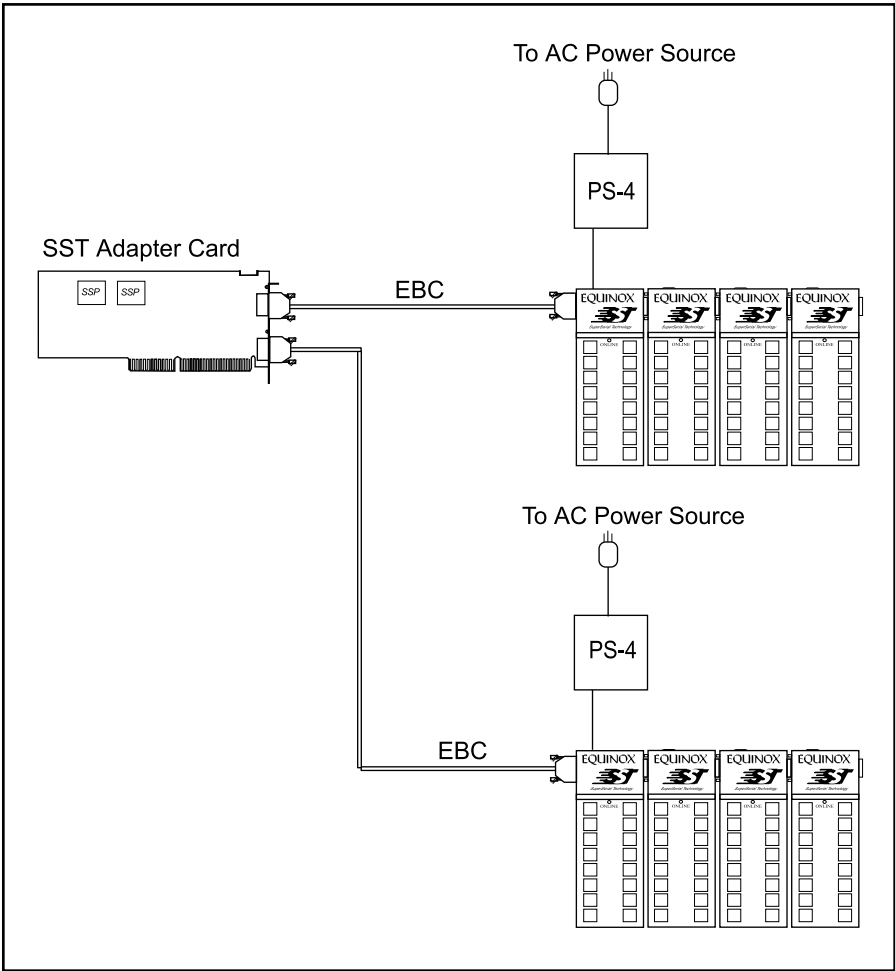


Figure 1-11. Maximum Number of Ports Per Adapter Card (128)



MIM-1 Module draws power from the SST Adapter Card, or a PS-4 Power Supply.

Figure 1-12 illustrates a mixture of *SuperSerial* components configured into a maximum of 64 ports on each Expansion Bus.

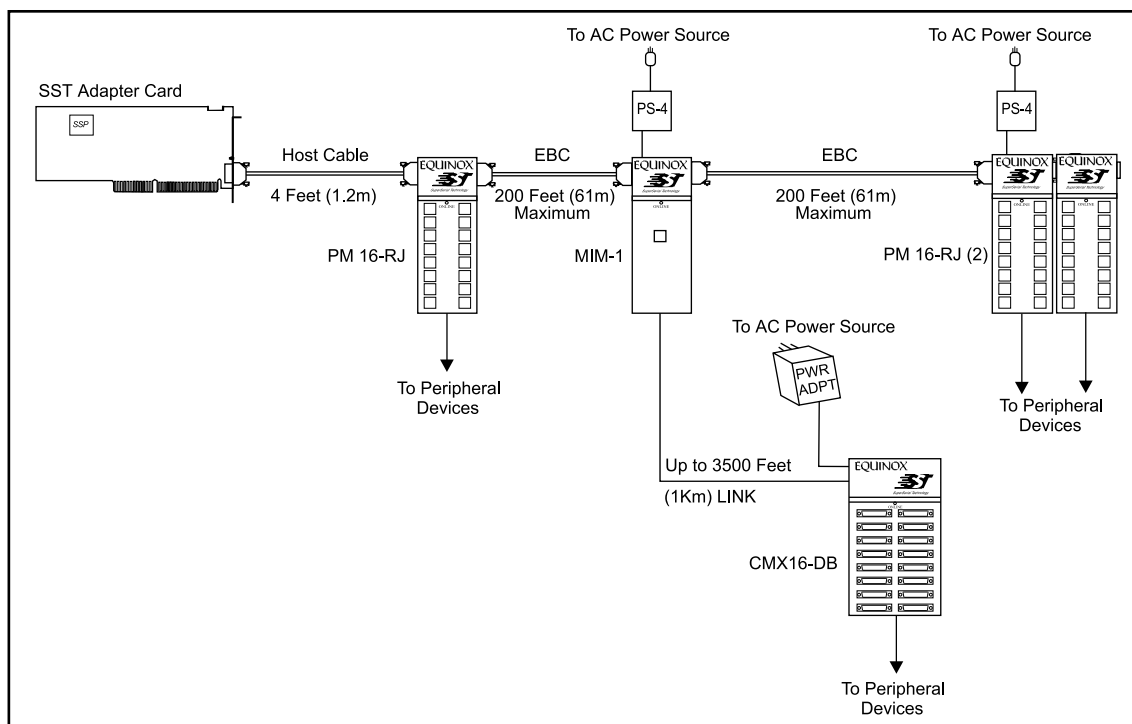


Figure 1-12. Mixed SST Hardware Configuration - Up to 64 Ports



Host Cables cannot be used between Expansion Modules.

Modem Pool Expansion Chassis

The Equinox *SST Modem Pool* connects ISA internal modems directly to an Expansion Bus. It can be installed in place of an Expansion Port Module or it can be connected directly to a host computer Adapter Card. Normally, the *Modem Pool Expansion Chassis* is installed as a stand-alone unit. However, an optional rack mounted unit is available. Refer to Chapter 6 for detailed information.

High Availability Cluster Feature

The *Equinox SuperSerial Technology (SST) High Availability Cluster* feature allows you to connect Port Modules to a second (redundant) host.

Equinox SST High Availability products are the first fault-tolerant Remote Access Server solutions that provide scalable modem and other serial I/O pooling in an NT or UNIX Clustering Environment. When used with Microsoft Cluster Server or UNIX High Availability software, mission-critical applications that use serial devices can be installed with the ability to automatically survive and recover from the failure of a server in the cluster. The list of applicable devices includes Modem Pools, Point-Of-Sale (POS) Terminals, Cash Registers, Bar-Code Scanners, Telecom gear and Industrial/Robotic equipment.



Application Notes:

- Neither the primary nor secondary *Expansion Bus Cables* may be more than 100 feet long.
 - *Port Modules* must be powered by a *PS-4 Power Supply*, not from the host board.
 - *Modem Pools* may be used in place of *Port Modules*. Multiple modem pools must be connected with 4-foot *Expansion Bus Cables* only.
 - The *MIM-1* and *PM8-DB* may not be used.
-

Installation

Each Cluster Cable (PN 790162) connects a Port Module to an Expansion Bus Cable. The gray end of the primary Cluster Cable plugs into the left side of the Port Module (see Figure 1-13). The black end plugs into a standard Expansion Bus Cable: PN 690277/8 (4 feet), PN 690302 (25 feet), or PN 690306 (100 feet). The other end of the Expansion Bus Cable plugs into an SST Host Card on the primary host.

The redundant cable works the same way, except its gray end plugs into the right side of the Port Module, and its Expansion Bus Cable plugs into an SST Host Card on the secondary host.

Either the primary or secondary host may be active, i.e., in control of the Expansion Bus. The designation of *primary* or *secondary* refers to the position of the host in the configuration. For configuration purposes, the primary host is on the left and the secondary host is on the right.

See the *Drivers and Software* options for your platform on the *Equinox* SuperSerial™ Software CD ROM for Cluster Software installation.

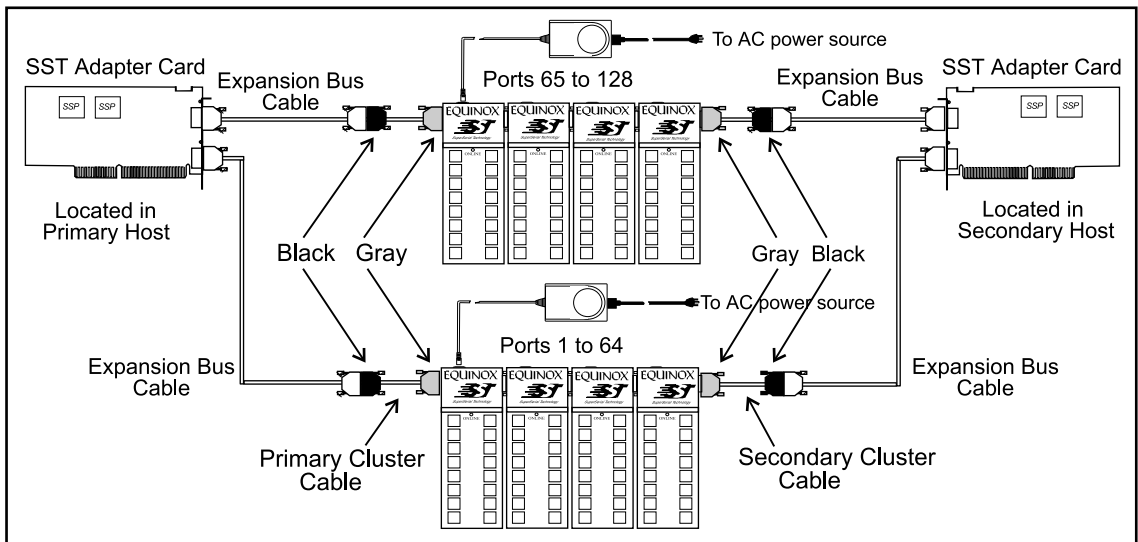


Figure 1-13. SST High Availability Assembly Drawing



If multiple Port Modules are used, they must be connected directly to each other as shown in Figure 1-13. You may not separate the Port Modules using Expansion Bus Cables in this configuration.

The *Adapter Card* appears to the system host processor as memory. That is, it is a memory mapped device. All *SST Adapter Cards* are **automatically** mapped into system memory at the time the device driver is installed. The device driver soft-configures all adapter cards each time the system is initialized (booted).

Adapter Card Installation

Prior to installing an *ISA Adapter Card*, assign the required I/O base address. This address is assigned by performing the procedure outlined under paragraph heading *ISA System Setup*.

Use the following procedure to physically install your adapter card. Alternatively, you may follow the installation instructions presented in your host system documentation.

1. Set the host computer system power switch to OFF and disconnect the power cord.
2. Locate a free expansion slot.
3. Insert and secure the adapter card firmly into the expansion slot.
4. Replace the power cord and turn the host computer system ON.

System installation setup requirements for ISA, EISA, Micro Channel and PCI Platforms are discussed later in this chapter.

ISA System Setup

This section discusses the *SST* I/O base address requirements for ISA systems.

Assigning I/O Base Address

ISA SuperSerial Technology Boards must be assigned a unique I/O base address. This can be accomplished by the use of *ISA Plug and Play (PnP)* or the *I/O Base Address Switch S1*.

PnP for ISA boards is not currently supported by all Operating Systems (OS). Consult your OS documentation to determine if it supports PnP.

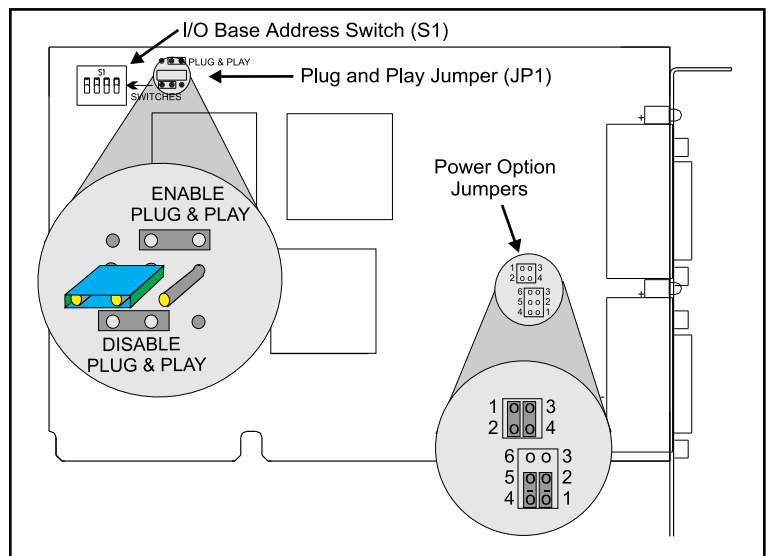


Figure 2-1. DIP Switch Location On ISA Adapter Card

If PnP is not supported by your OS, or if you are unsure, place the *PnP Jumper (JP1)* in the position closest to switch S1. This will disable PnP and enable the 4 position *I/O Base Address Switch* as shown below in Figure 2-2.

If multiple ISA boards are installed in the same system, a different address must be assigned to each board. (This is automatically accomplished if PnP is utilized.) This procedure should be performed before the board is physically installed.

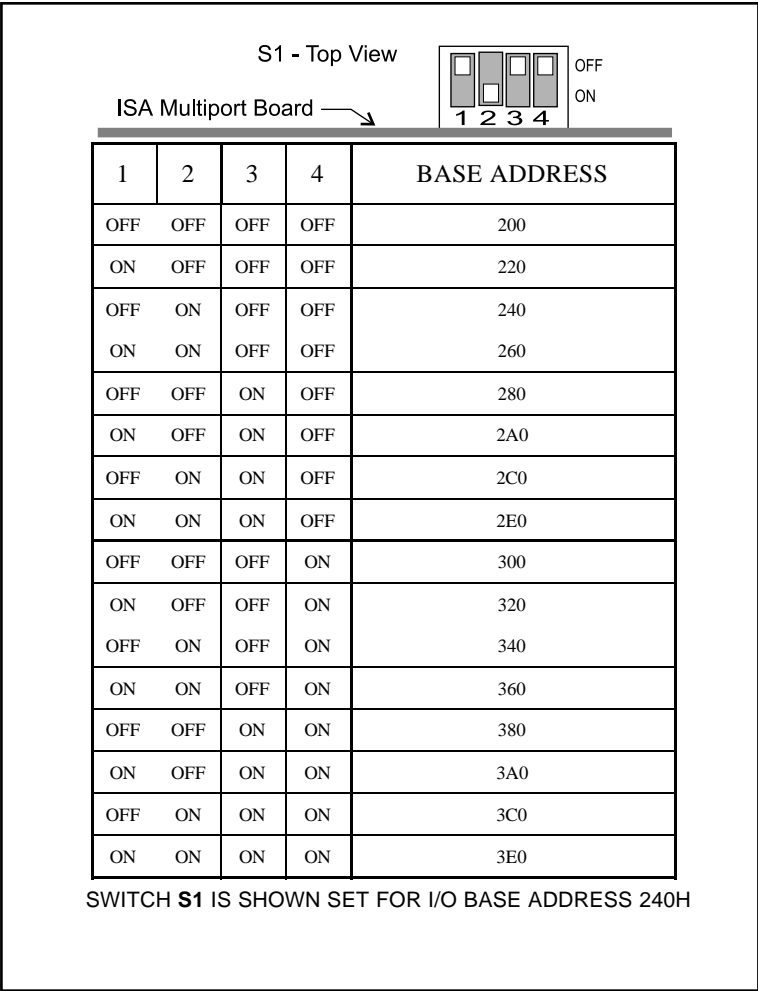


Figure 2-2. ISA I/O Base Address Selections

Address Log Record the base addresses assigned to all ISA Adapter Cards in the log below. This information may be required by the device driver during installation.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

EISA System Setup

The EISA Configuration Utility that came with your computer reserves system resources for each adapter card (subsystem) that is installed. This resource information is stored in the CMOS of the EISA system. When your system boots, the Equinox Software Driver reads the assigned adapter card information directly from the CMOS configuration. The following is a general discussion on using this system utility. However, you should consult your host documentation for specific procedures for your system.

EISA Configuration Diskette

System resources for *EISA Adapter Cards* are allocated by a menu-driven program provided by your computer system vendor. Usually there is a floppy disk provided called the *Configuration Utility*. This disk must be run whenever an adapter card is added or removed from the system.

Third party adapter card vendors, such as *Equinox*, supply a database of configuration information containing a list of system resources which the adapter card requires. *Equinox* locates the configuration (*.cfg*) files in the *disk 1* directory of the CD ROM. You are prompted to put this diskette into the floppy drive when configuring the system so that the database information can be copied onto the EISA System Disk for later use. Follow the procedures in your system documentation for the use of this utility. (If you are also installing an *ISA Adapter Card* see the beginning of this chapter for details on ISA I/O requirements.)



You need not be concerned when selecting valid address blocks. The EISA configuration program is designed to make sure there are no conflicts over system resources. However, AIO Novell NetWare Connect, OS/2, DOS (INT 14), Windows 3.x, and BSD UNIX drivers must be configured to operate between 640k and 1M (paged). All other UNIX and Windows NT drivers should be configured to operate in the two to four Gigabyte (flat) range.

Micro Channel System Setup

The *Micro Channel Setup Utility* that came with your computer reserves system resources for each board that is installed. This resource information is stored in the CMOS of the Micro Channel system. When your system boots, the Equinox software driver reads the assigned adapter card information directly from the Micro Channel CMOS configuration. Consult your host documentation for procedures specific to your system.

Micro Channel Reference Diskette

System resources for Micro Channel Adapters are resolved by a menu-driven program provided by your computer system vendor. Usually there is a floppy disk provided called the *Reference Diskette*. This diskette must be run whenever an adapter card is added or removed from the system. Each third party adapter card vendor (such as *Equinox*) supplies an *Option Diskette* containing a database of required system resources.

The first time you turn on the computer system with the new *Adapter Card* installed, an error code appears and two (2) beeps sound after the RAM is counted. This error message indicates a configuration change was performed and the machine must be reconfigured to recognize the new *Adapter Card(s)*. Micro Channel machines require an Adapter Description File (**.adf**) to automatically configure each adapter card installed. The system identifies the adapter card by requesting a Programmable Option Select (POS) ID from Adapter Cards installed in the computer. The POS ID for the *SST-4* and *SST-8* Adapter Cards is 638A. The corresponding **.adf** files (@638A.adf etc.) for the Adapter Cards containing the configuration information are located in the *disk 1* directory of the CD ROM. When configuring the system, you are prompted to put this option diskette into the floppy drive so that the database can be copied onto the *Reference* diskette for later use. Follow the procedures in your system documentation for the use of this utility.

PCI System Setup

Peripheral Component Interconnect (PCI) system architecture has a design feature termed *Plug and Play*. This feature automatically detects, identifies and configures the currently installed devices each time the system is booted. Therefore, whenever an adapter card is installed (or removed) in a PCI system, the card is recognized and configured immediately upon restart.

Host Power “Y” Cable (128 Port EISA & ISA Adapter Cards only)

The *Host Power “Y” Cable* is included with *EISA and ISA 128 port Adapter Cards (PN 990247, PN 990260, PN 990271 & PN 990269)*. This cable provides power from the host power supply for Modules connected to the second Expansion Bus. Connect the host power “Y” cable as described below:

- If necessary, remove all power from the computer. (Turn power switch OFF and unplug main power cord.)
- If necessary, remove (or lift up) the host computer system chassis cover.
- Locate a power supply cable connected to a component (e.g. floppy disk drive) in your host computer system. If possible, select the component nearest the location of the power connector on the adapter card.
- Remove the host power supply cable connector plug from the selected host computer system component power connector socket.
- Connect the removed host power supply cable connector plug to a mating connector socket on the host power “Y” cable supplied by Equinox.
- Connect the host power “Y” cable connector plug to the host computer system component where the power supply cable connector plug was removed.
- If necessary, connect the other host power “Y” cable connector socket to the power connector plug on the *128-port Adapter Cards*.
- Replace the chassis cover (or close) and restore power to the host computer system.

3 SST Expansion Module Installation

SuperSerial™ Technology

SST Port Modules are used to connect peripheral devices directly to the *Expansion Bus*. Both 8-Port and 16-Port Modules are available with a choice of DB-25 or RJ-45 connectors. Figure 3-1 illustrates four types of *SST Port Modules* and the *MIM-1*. The *MIM-1* is used to connect the *Cluster Multiplexer (CMX)* to the *Expansion Bus*.

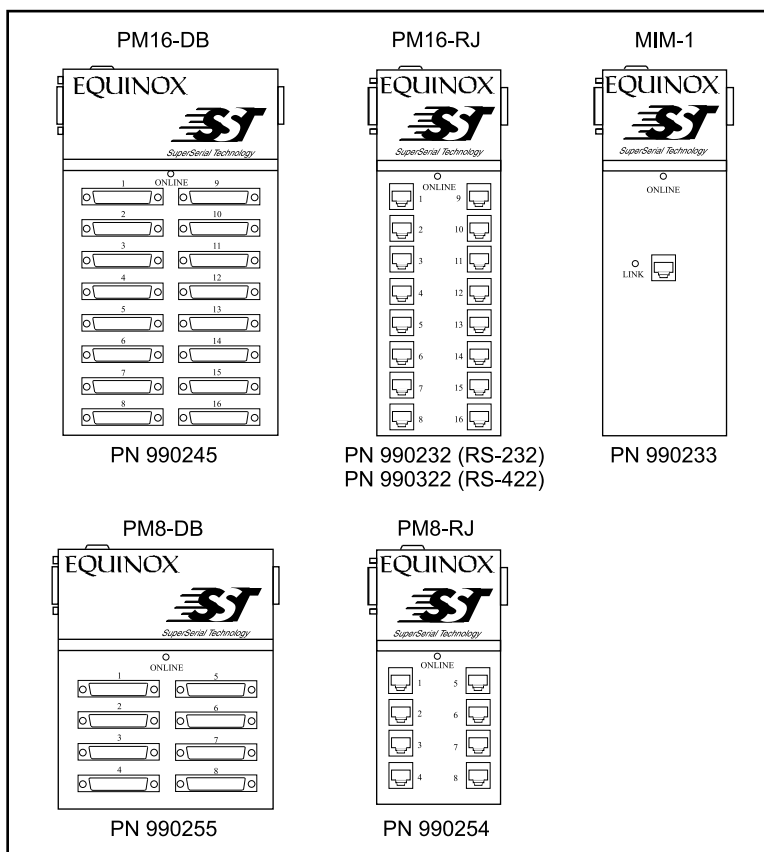


Figure 3-1. SST Expansion Modules

In the following paragraphs, references to *Expansion Modules* includes the *SST Port Modules* and *MIM-1*.

Installing Expansion Modules

Up to four *SST Expansion Modules* may be grouped together and connected to an adapter card via an *Expansion Bus*. The Expansion Bus connector may be either a 4-foot (1.2m) *Host Cable* or an *EBC*.

Included with each *Expansion Module* are two L-shaped coupler brackets and twelve screws (8 black-anodized and 4 nickel-plated). Group the Modules by mating them together as shown in Figure 3-2.

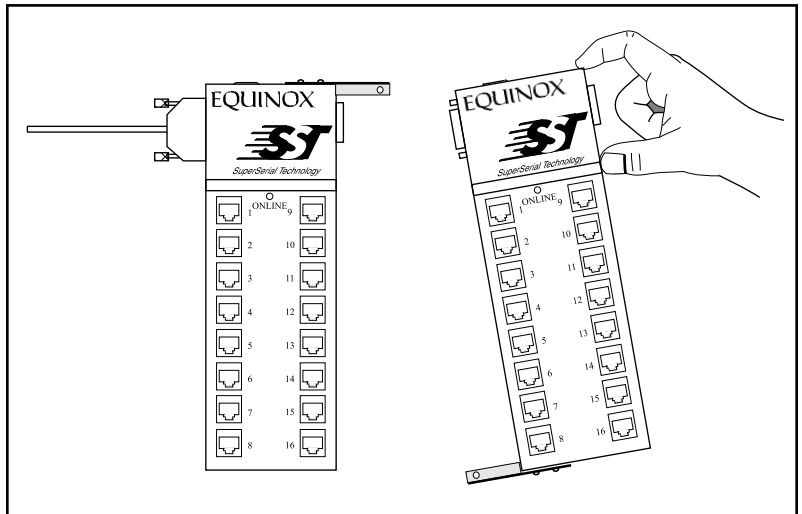


Figure 3-2. Mating Two Expansion Modules

Attach the coupler brackets as indicated in Figure 3-3.



Use the nickel-plated screws to secure the coupler brackets to the back of the *Expansion Modules* and the black-anodized screws to secure the coupler brackets to the top and bottom of the expansion modules.

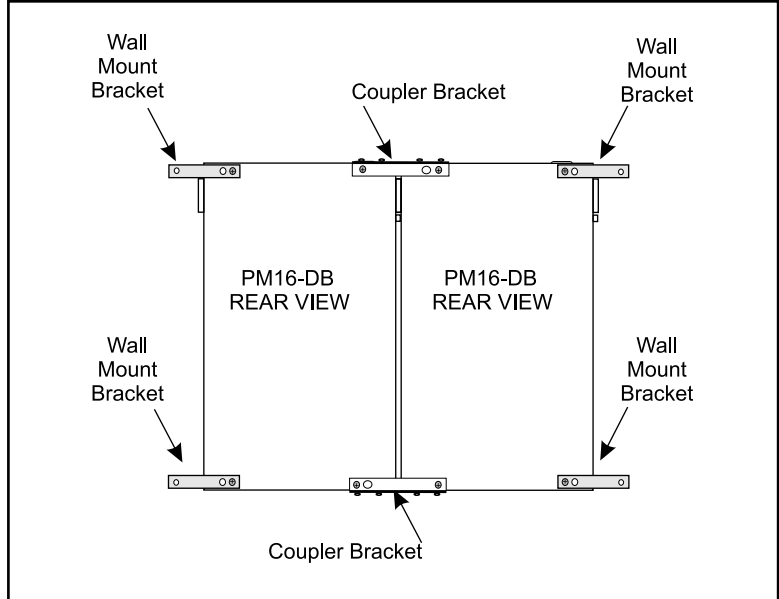


Figure 3-3. Coupling and Surface Mounting Two PM16-DB Port Modules

Also included with each Expansion Module are two wall mounting brackets and four screws. Attach the mounting brackets to the appropriate modules and secure them to a wall as shown in Figure 3-3.



1. The bottom coupler bracket is not used when mating an 8-Port Module with a 16-Port Module,
 2. Attach one bracket on the top and one bracket on the bottom at the opposite side of the Module when mounting a single Module to a wall
-

Expansion Bus Cabling

Connect Modules to the host computer using the supplied host cable or optional Expansion Bus cables provided by Equinox. Referring to Figure 3-4, connect the cable for ports **1 through 64** to the lower connector of the adapter card and the cable for ports **65 through 128** to the upper connector.

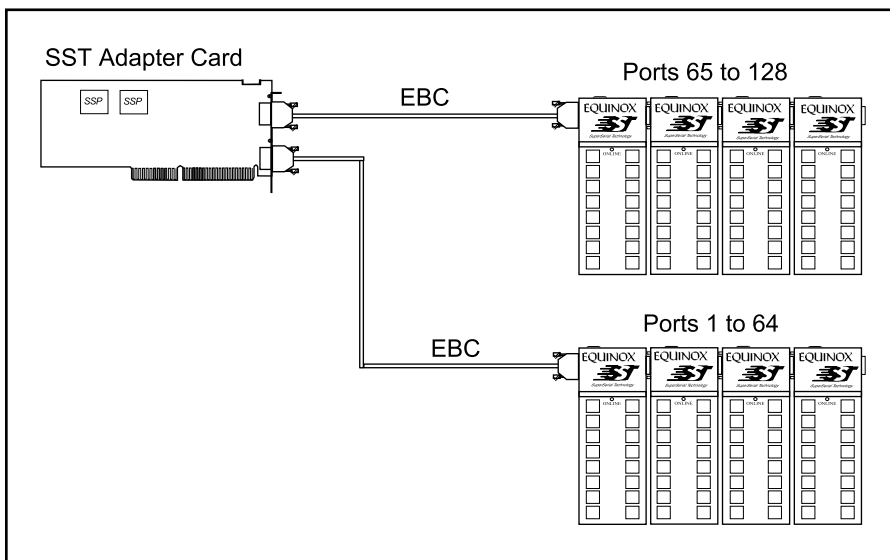


Figure 3-4. EBC Port Assignments



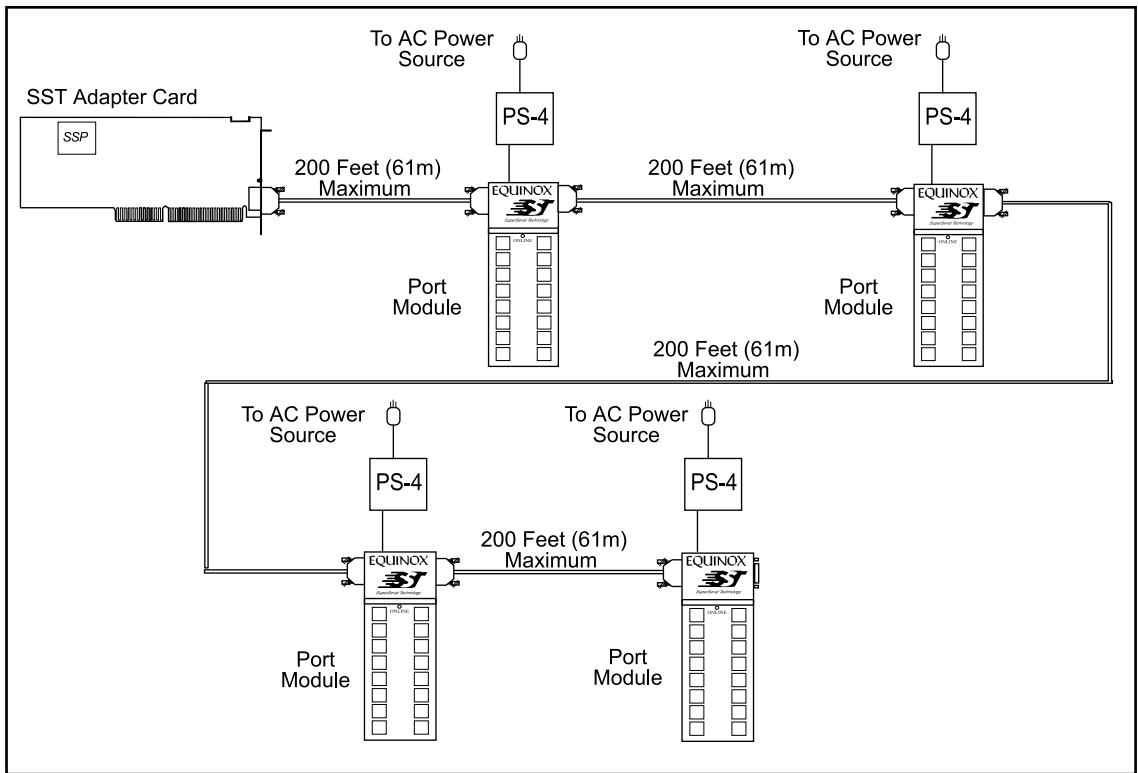


Figure 3-6. Hardware Configuration Illustrating Maximum Distance Permitted Between Expansion Modules

Up to four Expansion Modules can be interconnected at distances of up to 200 feet (61 m) between one another as shown in Figure 3-6. When distances between Expansion Modules exceed 200 feet (61m) or when the peripheral devices are located in a different building, a *MIM-1* with *CMX* should be used. Refer to the *SST Multiplexer Installation* section (Chapter 4) for this information.

Installing the PS-4 Power Supply

PS-4 (PN 990274), Figure 3-7, is a universal power supply and automatically adapts to the input power voltage (100 - 250 VAC, 47 - 63 Hz).

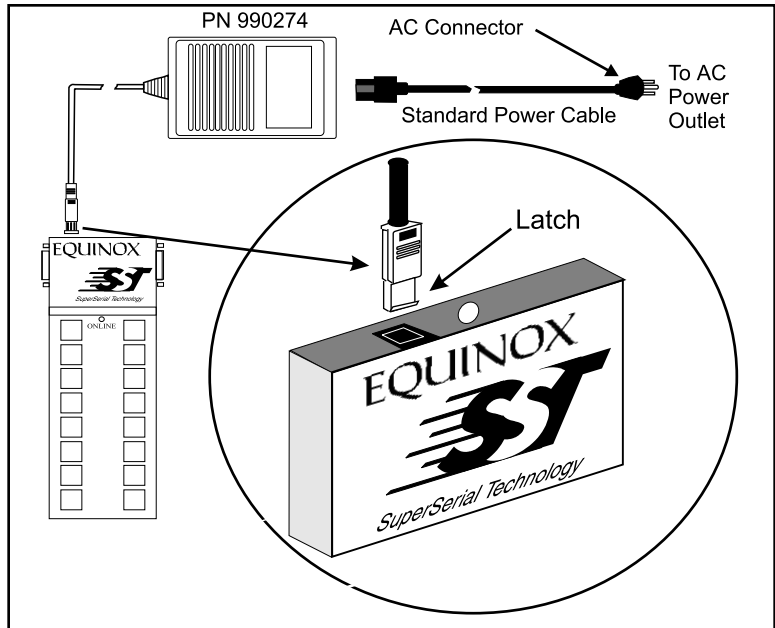


Figure 3-7. Model PS-4 Power Supply.

Install the *Model PS-4 Power Supply* using the following procedure:

1. Remove the power plug cover (use a small flat screwdriver) protecting the power connector on the Expansion Modules .
2. Insert the DC output cable plug into the Expansion Module connector with the latch of the plug facing the front of the Module (see Figure 3-7 insert). Press down firmly until a snapping sound is heard.
3. Connect the *PS-4* power cable to an AC power outlet.

Module LEDs

Once the PS-4 is installed, any power source to the left of the Expansion Module is automatically disconnected.

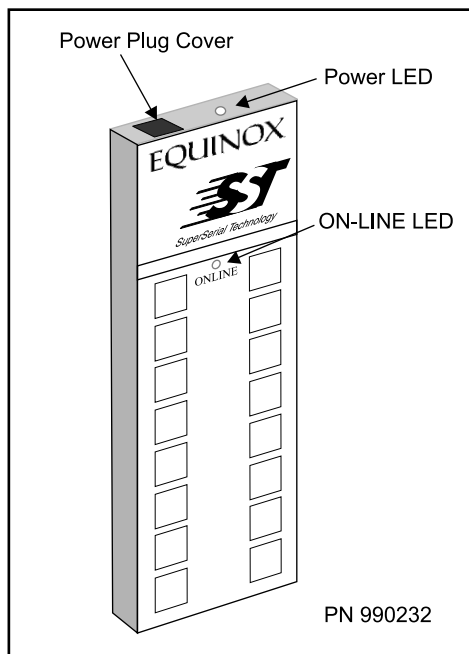


Figure 3-8. Power Plug Cover & LEDs on Port Module

Each Port Module contains an ON-LINE LED and Power LED indicator (see Figure 3-8). The ON-LINE LED is not functional until the driver software is installed.

In addition to the ON-LINE and Power LEDs, the *MIM-1* also contains a LINK LED. The LINK LED is not lit until the software driver is installed, a *CMX* is connected and power is present.

The Power LED is lit when power is present in the Expansion Modules. Refer to the appropriate driver software manual for details concerning all other LEDs.

CMXs are used when peripheral devices are located more than 200 feet (61m) from the host computer system or when they are located in a separate building. The *CMX* is installed near the peripheral devices and is connected to the *Adapter Card* via a *MIM-1*. The *MIM-1* is usually installed near the host computer. A *CMX* is connected to the *MIM-1* via an unshielded two-twisted pair (UTP) link cable. Both DB-25 and RJ-45 connectors are available in 16-port clusters as shown in Figure 4-1.

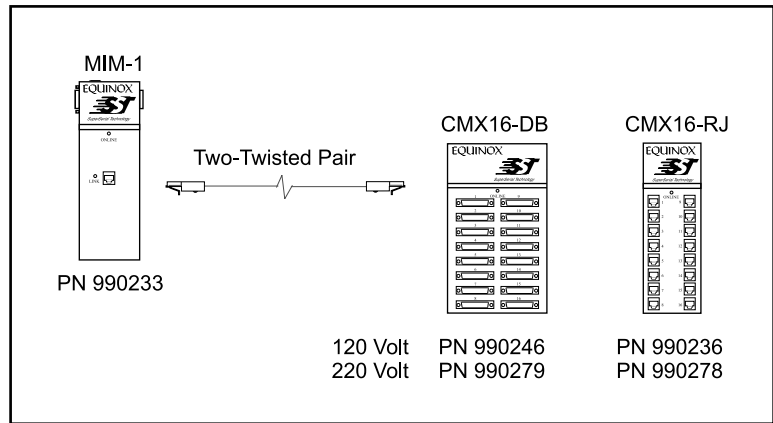


Figure 4-1. MIM-1 to CMX 16-DB or CMX 16-RJ

SST CMXs

CMXs are used to connect the peripheral devices to the *Expansion Bus* via a link cable and a *MIM-1*. The *CMX* is usually located in the immediate area of the devices to be connected. Figure 4-1 shows the link cable connection between the *MIM-1* and the *CMX*.

Wall Mounting

Included with each *CMX* are two wall mounting brackets and four screws. Attach one mounting bracket to the top right side of the unit and attach the other bracket to the bottom left side of the unit. Refer to Figure 3-3 for the approximate location of the mounting bracket screw holes. Note: *CMXs* are wall mounted the same as port modules. See Chapter 3 for details.

Power Adapters

Each *CMX* is supplied with one of the following external power adapters:

- *Power Adapter PN 200144* for 115 VAC power source
- *Power Adapter PN 200129* for 230 VAC power source

Figure 4-2 shows the location of the *Power Adapter Jack*.

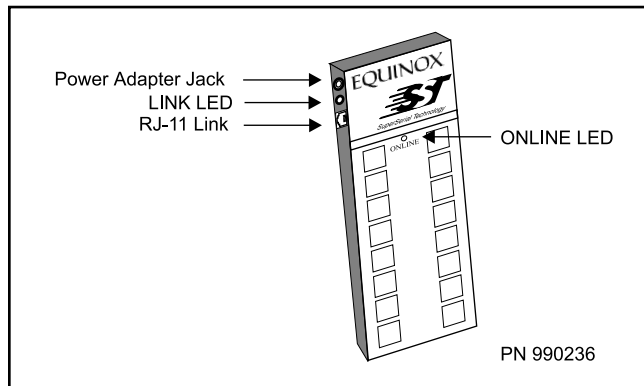


Figure 4-2. CMX16-RJ CMX

Multiplexer Link Cable

Connect the *MIM-1* to the *CMX* (see Figure 4-3) using a UTP Link Cable (Belden 1227A or equivalent) not to exceed 3,500 feet (1Km). A 10-foot (3.48m) link cable is supplied with the *MIM-1* for diagnostic purposes.

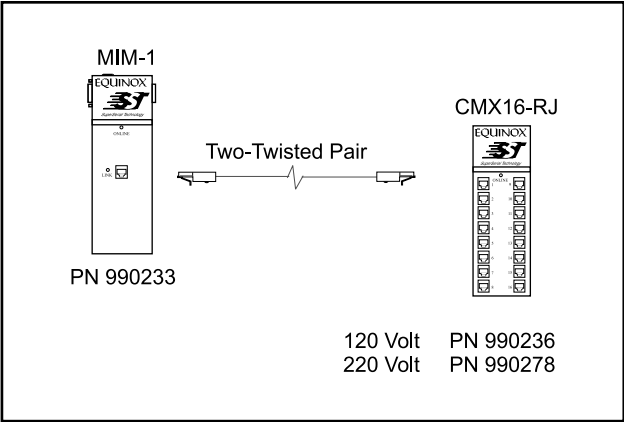


Figure 4-3. *MIM-1* to *CMX* Link Cable



The link LEDs on the *MIM-1* and *CMX* are lit after connecting the link cable, applying power and installing the software driver.

Figure 4-4 shows a schematic of the two-twisted-pair cable.

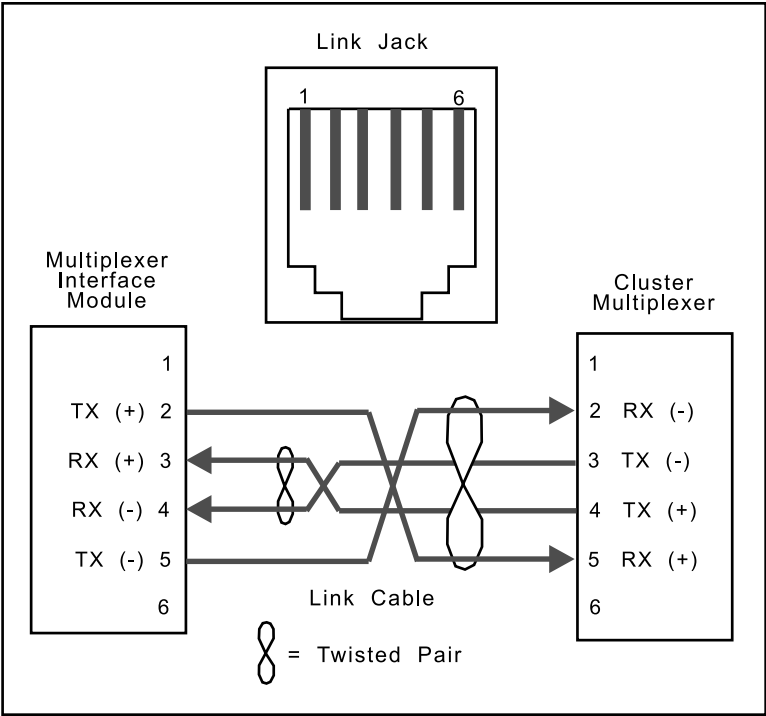


Figure 4-4. Multiplexer Link Cable Wiring

The *SST Expanded I/O Subsystem* supports a wide variety of devices (both DCE and DTE), a range of cables from 4-wire RJ-11 to 10-wire RJ-45 and several different types of end connectors (DB-25, DB-9, RJ-11 and RJ-45).

All *SuperSerial™* ports provide a standard RS-232 interface with full modem control signals.

To assist in wiring the I/O ports, *Equinox* sells a complete set of cabling accessories. See an *Equinox Ordering Guide* for more information.

PM16-DB, PM8-DB and CMX16-DB Port Pinouts

The PM16-DB, PM8-DB and CMX16-DB ports provide standard RS-232 DTE signals on all DB-25 female connectors, one for each connected device (see Figure 5-1).

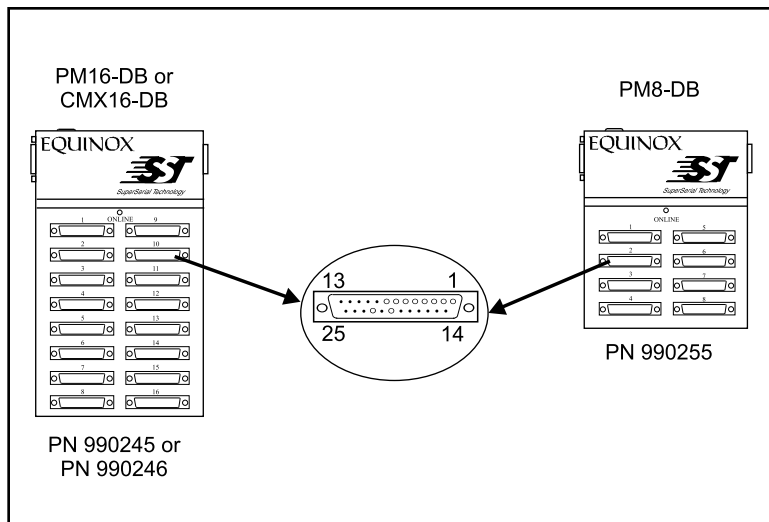


Figure 5-1. PM16-DB, PM8-DB and CMX16-DB Port Connector Orientation

The pinouts for all female DB-25 connectors are identical (Figure 5-2).

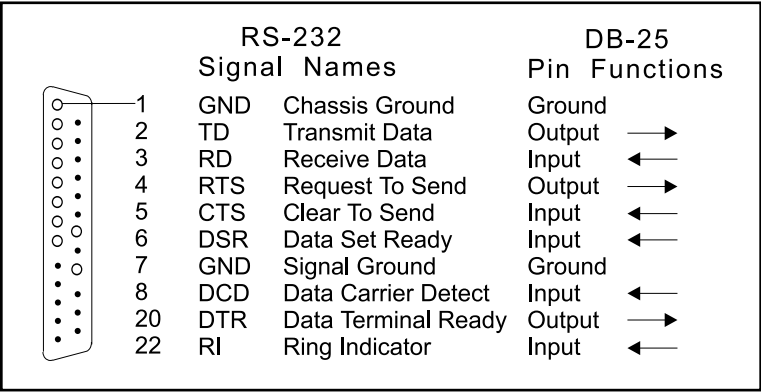


Figure 5-2. Female DB-25 Connector Pinouts

Device Wiring Device wiring is dependent on the specific signal requirements of the system peripheral devices. Cable connectors plugged into the PM16-DB, PM8-DB or CMX16-DB ports must have a male DB-25 connector. The connector on the opposite end of each cable should mate to the peripheral device port (terminal, printer, personal computer or modem).

Depending on the specific signal requirements of the system peripheral devices, 3-, 4-, or 7-wire connections can be made.

Figures 5-3 through 5-5 show the cable configurations for these connections.

Figures 5-6 and 5-7 illustrates a modem cable.

Three Wire Connection
(Figure 5-3)

For terminals and printers using XON/XOFF flow control.

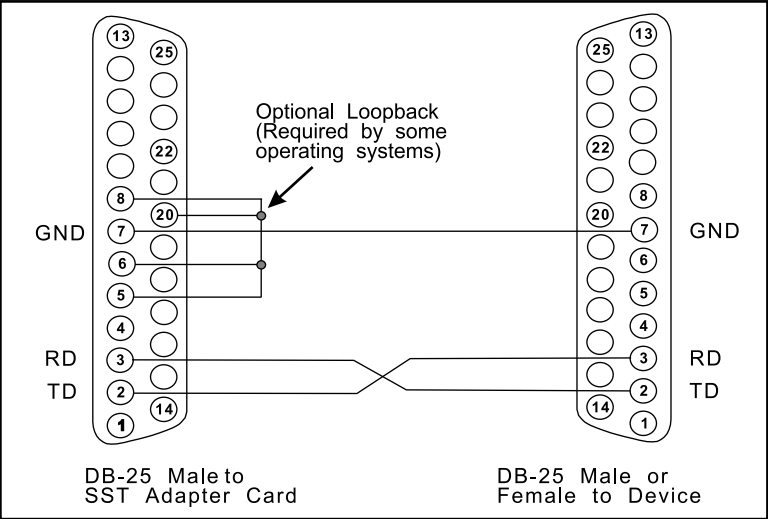


Figure 5-3. Pinouts for a Terminal or Printer Cable

Four Wire Connection
(Figure 5-4)

For terminals and printers using pin 20 hardware flow control.

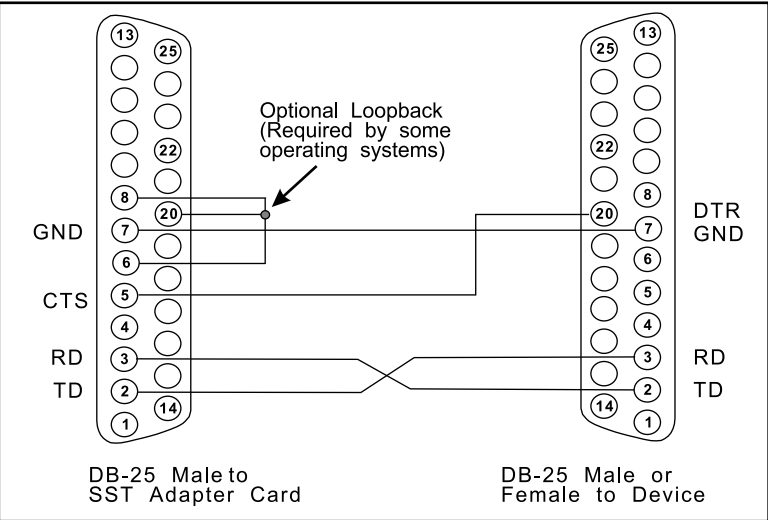


Figure 5-4. Cable for a Terminal or Printer Using DTR Flow Control

Seven Wire Connection
(Figure 5-5)

For full modem control signals to a terminal or printer.

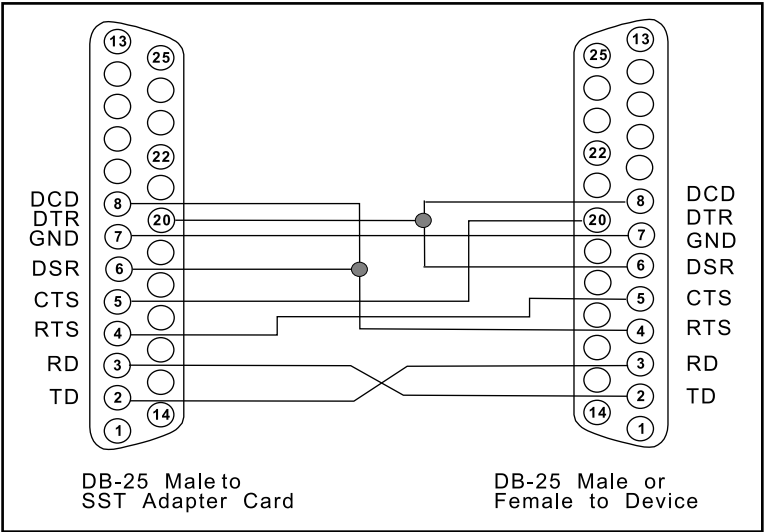


Figure 5-5. Cable for a Terminal or Printer Using DTR Flow Control

Modem Connection
(Figure 5-6)

For full modem control signals to a modem.

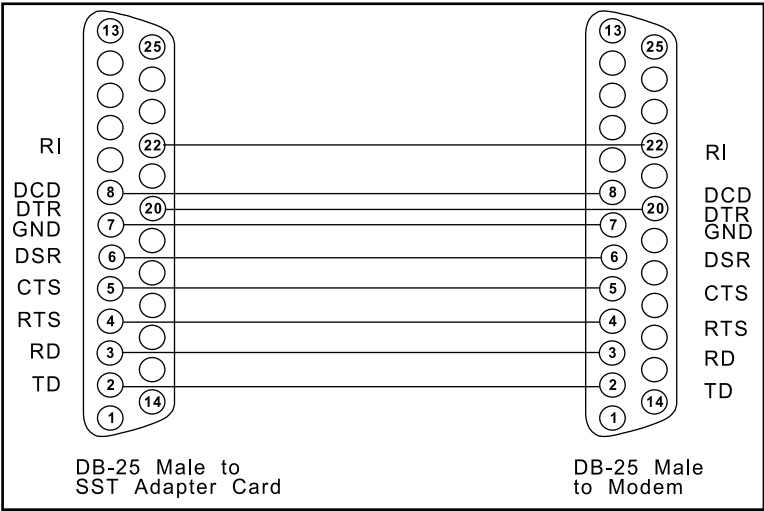


Figure 5-6. Pinouts for a Modem Cable

**Personal Computer
Serial Port (Figure 5-7)**

For personal computer serial port using DB-9 connector.

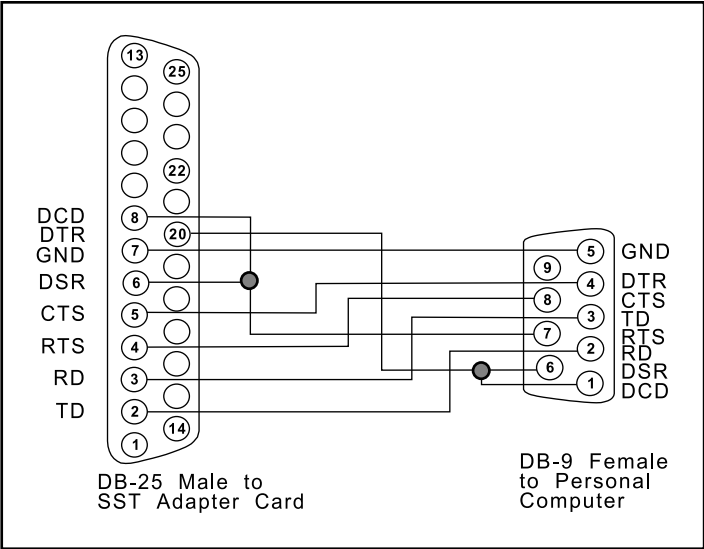


Figure 5-7. Cable to a Personal Computer Serial Port

PM16-RJ, PM8-RJ and CMX16-RJ Port Pinouts

The PM16-RJ, PM8-RJ and CMX16-RJ ports provide standard RS-232 DTE signals on all RJ-45 modular jacks (10-pin), one for each device to be connected as shown in Figure 5-8 .

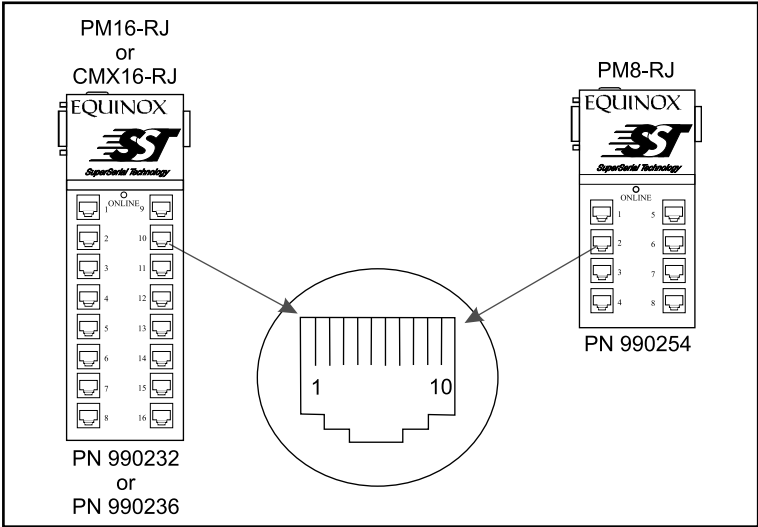


Figure 5-8. PM16-RJ, PM8-RJ and CMX16-RJ Port Connector Orientation

The pinouts for all RJ-45 jacks are identical (see Figure 5-9).

RJ-45 Pin Numbers	Signal Name	RJ-45 Pin Functions
1	1- RI Ring Indicator	Input ←
2	2- RTS Request To Send	Output →
3	3- DTR Data Terminal Ready	Output →
4	4- RD Receive Data	Input ←
5	5- GND Ground	Ground
6	6- TD Transmit Data	Output →
7	7- GND Ground	Ground
8	8- DCD Data Carrier Detect	Input ←
9	9- CTS Clear To Send	Input ←
10	10- DSR Data Set Ready	Input ←

Figure 5-9. RJ-45 Jack Pinouts

Please note the following cabling considerations:

- All jacks on the PM16-RJ, PM8-RJ and CMX16-RJ units face the front of the product with the key pointed down. Refer to Figure 5-8 for the modular jack wiring orientation.
- Although the port modules use 10-pin modular jacks, the signal pinouts have been arranged such that 4-, 6- or 8-wire modular plugs may be used. Since the receive and transmit signals (and ground) are on the inner four wires, a 4-wire connection may be made to data-only devices.
- Either twisted-pair or flat modular cable may be used as a signal path from PM16-RJ, PM8-RJ and CMX16-RJ SuperSerial ports to peripheral devices. However, twisted-pair cables will greatly increase the operating distance.



Twisted-pair cables significantly increase the operating distance between SuperSerial ports and peripheral devices.

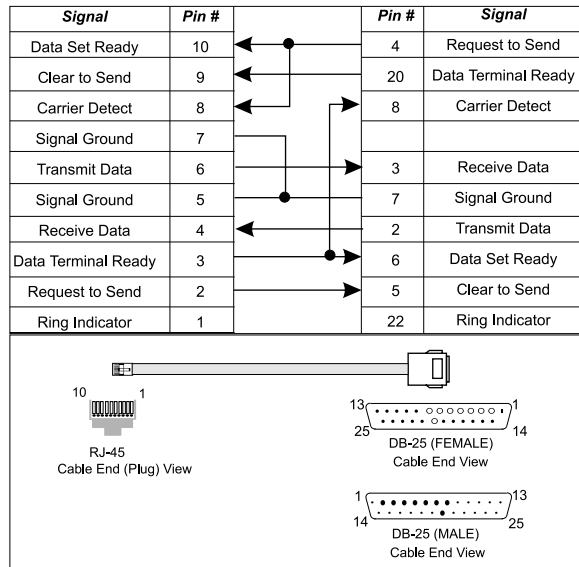


Figure 5-10. Cable pin- outs for RJ-45 to terminal/prtner DB-25

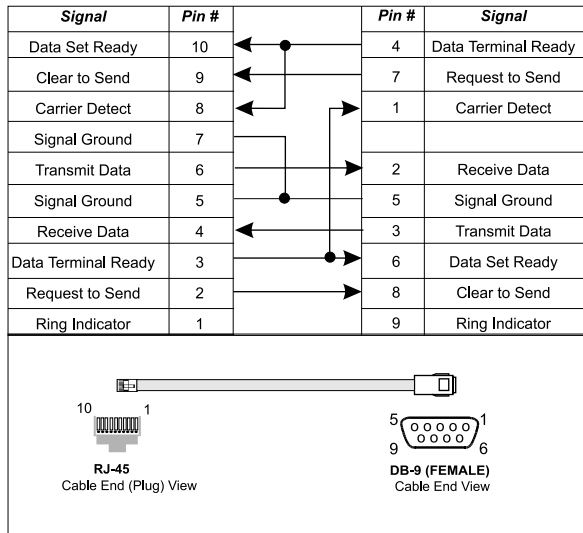


Figure 5-11. Cable pin- outs for RJ-45 to PC DB-9

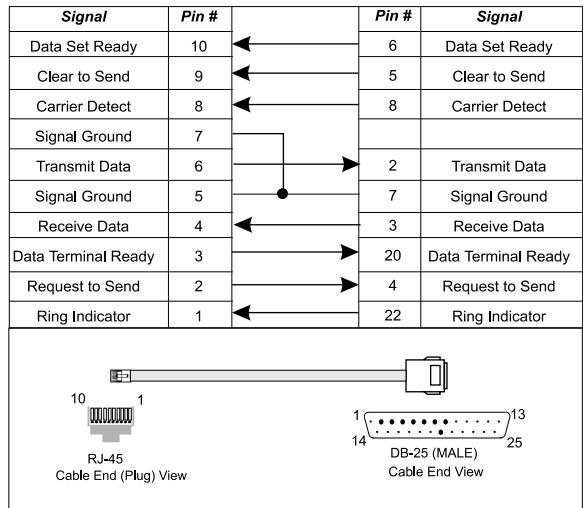


Figure 5-12. Cable pin -outs for RJ-45 to modem DB-25

Modular Cables

Following are cable diagrams detailing how to build your own cables to go between a RJ port module and your terminals, printers, PCs, modems, etc.

RJ-45 modular cable is the flat cable used for wiring telephones inside of buildings. The cable is terminated at each end with a RJ-45 modular plug (connector) which is inserted into the modular jack of an appropriate wiring module. Standard modular cables available from Equinox are reversing. That is, the pins are reversed on each end so that pin 1 on one end is connected to pin 8 or 10 on the opposite end, etc. Figure 5-13 illustrates the signals passed through modular cables when connected to a PM16-RJ, PM8-RJ or CMX16-RJ SuperSerial port.

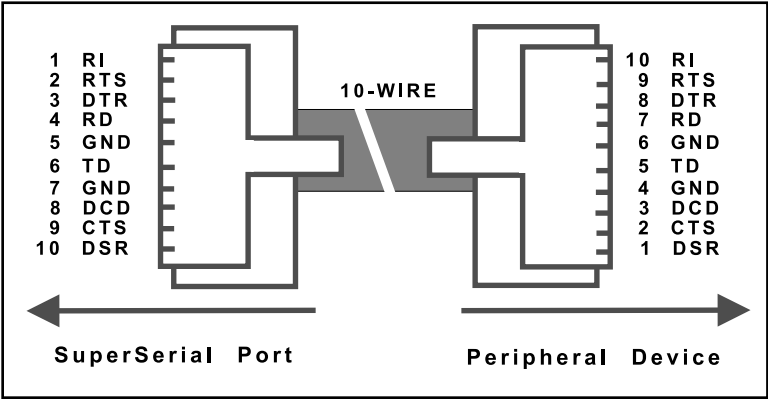


Figure 5-13. RJ-45 Modular Cable Signals



If your operating system does not require RI or DSR, an 8-wire cable may be used.

Modular Adapters

Ten wire modular adapters convert modular jacks to DB-25 (RS-232) connectors. Use Figure 5-14 as a guide in conjunction with the documentation provided with the host computer equipment to select the correct modular wiring accessories.

Figure 5-14 shows the internal wiring for the 10-wire Modular Adapters.

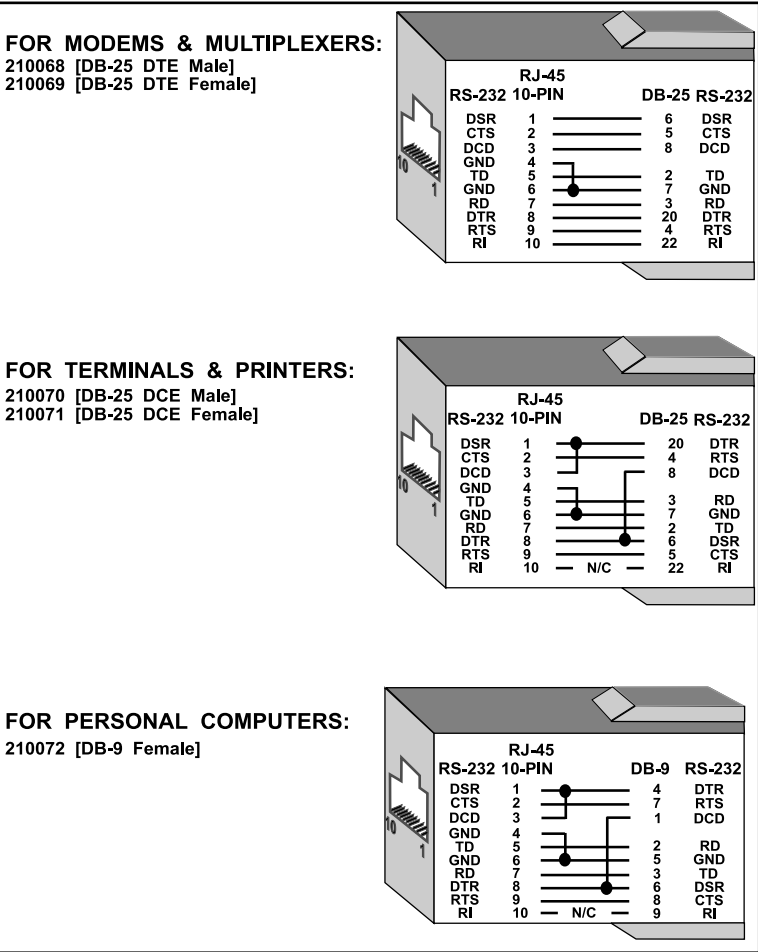


Figure 5-14. Ten-wire Modular Adapters

PM16-RJ/422 Port Module

The *PM16-RJ/422 (RS-422) Port Module* is installed into a system in the same manner as described in Chapter 3. Refer to Chapter 3 for information on installing *Port Modules*.

Figures 5-15 and 5-16 below show the *PM16-RJ/422 Port Module* pin-outs.

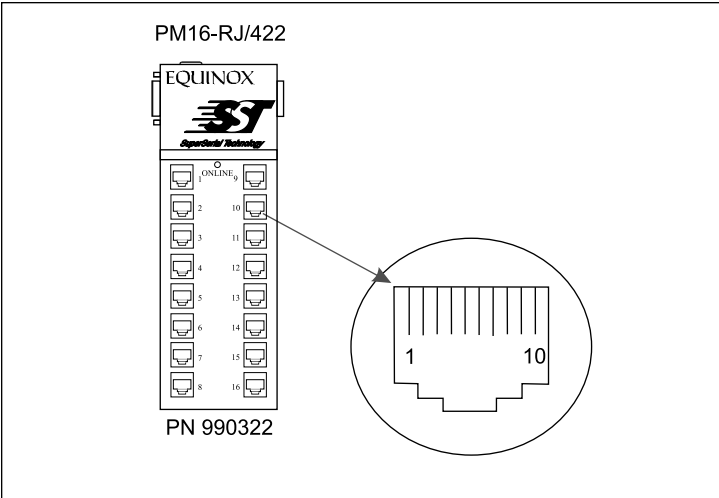


Figure 5-15 RJ/422 Port connector orientation

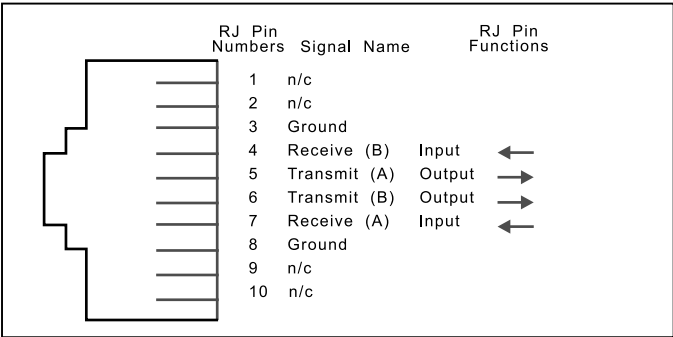


Figure 5-16. RS-422 Port Pin-outs

The *Equinox SuperSerial™ Technology (SST) Modem Pool* allows the connection of up to 16 internal modems directly to UNIX, Novell, or Windows NT Operating Systems via an *SST Expansion Bus Cable* (see Chapter 3). The *SST Modem Pool* can be installed as a stand-alone unit, or optionally, rack mounted (PN 790140). The basic components for an *Equinox SST Modem Pool* include:

- One *SST Adapter Card (ISA, EISA, PCI or MCA)*
- One *SST Modem Pool Expansion Chassis*
- One *SST Modem Pool Expansion Slot Cover Kit (790155)*
- One *Expansion Bus Cable*

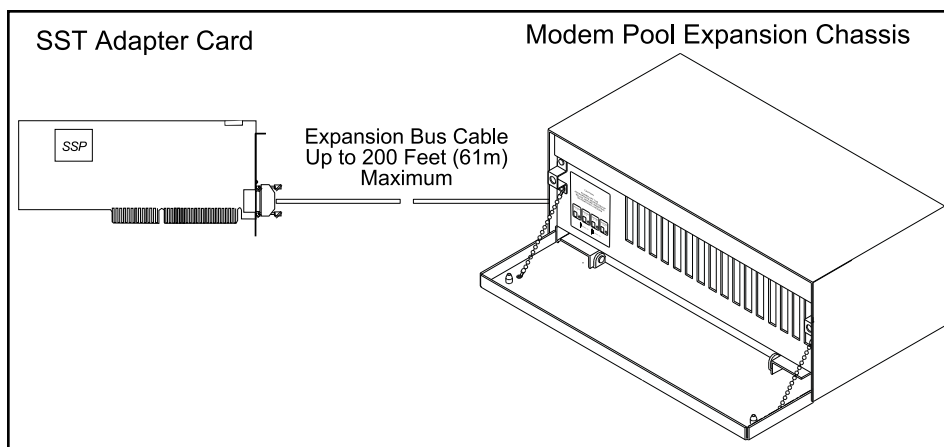


Figure 6-1. Equinox Modem Pool Basic Components

Up to four *SST Modem Pool Expansion Chassis* can be connected to a 64-port *Adapter Card*. Therefore, up to 64 internal modems can be installed in a single *SST Modem Pool Expansion Chassis* subsystem.

Adapter Card

The *SST Adapter Card* (see Chapter 1) occupies a single bus slot in the host computer and provides the intelligent communications functions to "off-load" virtually all the serial communications burden from the system. *ISA, EISA, PCI and MCA Bus SST Adapter Cards* are available for systems using UNIX, Novell, or Windows NT Remote Access Operating Systems (see Table 1-1, Chapter 1). The *SST Adapter Card* is connected to the *Modem Pool Expansion Chassis* via an *Expansion Cable*.

Modem Pool Expansion Chassis

The *SST Modem Pool Expansion Chassis* (see Chapter 1) is a stand alone unit. The first chassis must be located within 200 feet of the host computer. Up to three subsequent *SST Modem Pool Expansion Chassis* may be located within 200 feet from one another. Each *SST Modem Pool Expansion Chassis* contains the following:

- Power Supply
- Backplane Board Assembly (16 ISA modem slots)

Expansion Bus Cable

A four foot *Expansion Bus Cable* is provided with each *SST Modem Pool*. When connected, this cable carries all data traffic between the host computer system and the *SST Modem Pool Expansion Chassis*. Power is provided by the *SST Modem Pool* internal power supply. *Expansion Bus Cables* of up to 200 feet (61m) may be used between units.

Installation

The *SST Modem Pool Expansion Chassis* is normally installed within four feet of the host computer. However, it may be connected in a system in the same position as a *Port Module* (see Chapter 3). That is, it may be installed in place of an *SST Port Module* within the host computer cabling scheme. It must be installed within 200 feet from the preceding unit (host computer or *Expansion Port Module*).

Install the *SST Modem Pool* by performing the following procedure:

- Make sure the host computer system power is turned OFF.
- Install the *SST Adapter Card* according to the procedure outlined in Chapter 2.
- Select a convenient location to install the *SST Modem Pool Expansion Chassis*.



If the unit is to be rackmounted follow the installation instructions included with the rackmount kit.

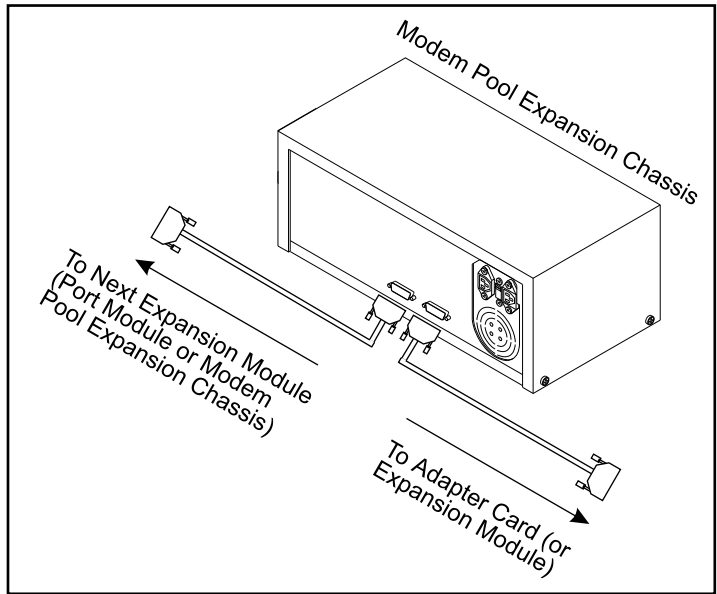


Figure 6-2. Equinox Modem Pool Expansion Chassis Cable connections

- Connect one end of the *Expansion Bus Cable* to either the *SST Adapter Card* connector or the right side connector on an *Expansion Port Module* (not shown).
- When facing the rear of the *SST Modem Pool Expansion Chassis*, connect the other end of the *Expansion Bus Cable* to the right side connector, as shown in Figure 6-2.

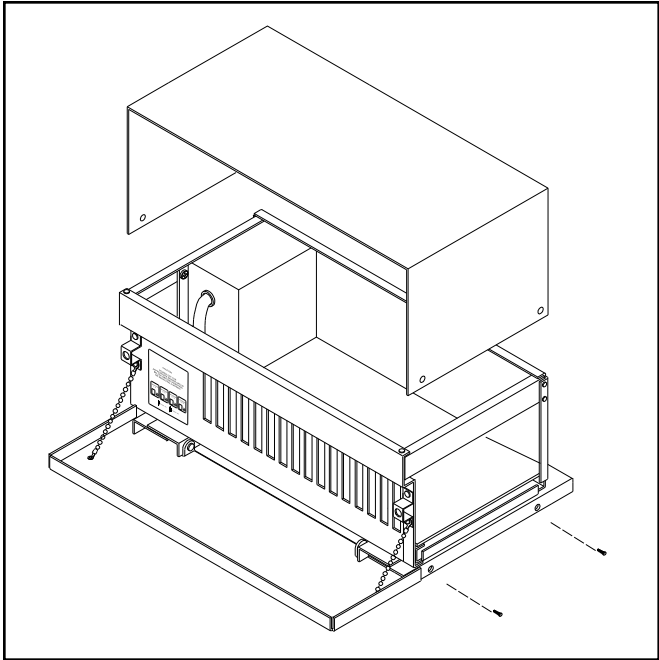


Figure 6-3. Remove modem pool cover

- Remove cover as shown in Figure 6-3.
- Install up to 16 ISA modems in the *Expansion Chassis*, starting in slot one (closest to the power supply).
- Connect telephone cables to modems by sliding the cables through the opening of the bottom rear of the *SST Modem Pool Expansion Chassis*.
- Install *Expansion Slot Covers* (Kit 790155) in all unused slots.

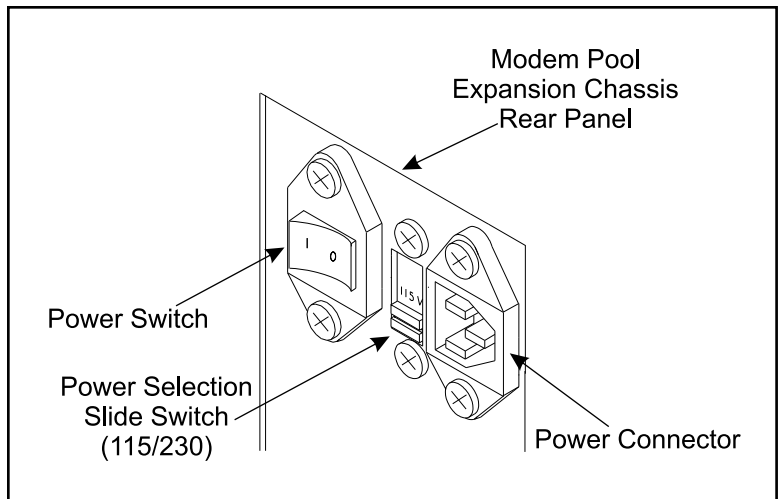


Figure 6-4. Equinox Modem Pool Expansion Chassis Power connections

- Set the *Power Selection Slide Switch* (located between the power switch and the power connector on the rear of the chassis) to match your main power voltage source (see Figure 6-4).
- Connect the power cord to the connector on the back of the *SST Modem Pool Expansion Chassis*.
- Connect the other end of the power cord to the proper power source outlet.
- Turn the *SST Modem Pool Expansion Chassis* power switch ON.

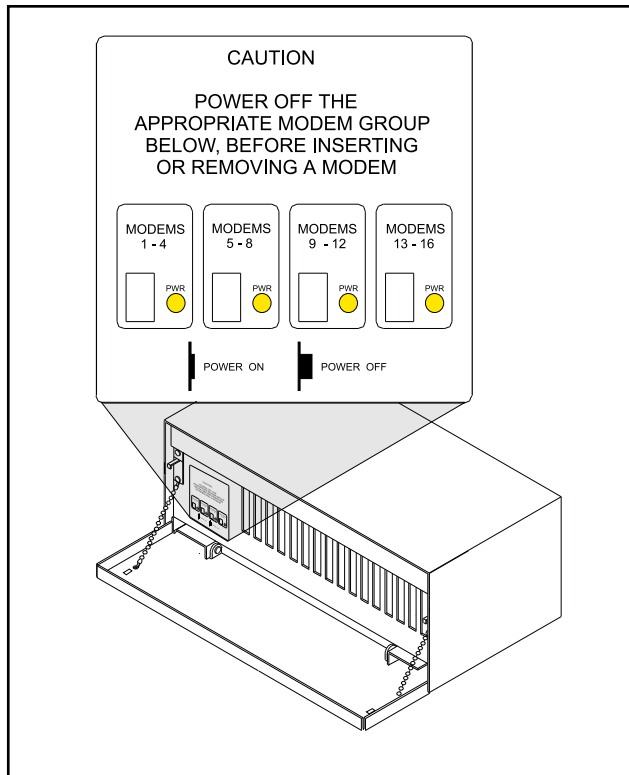


Figure 6-5. Modem group power switches

- Power on the appropriate modem group(s) on the front of the chassis and verify the LED is lit (see Figure 6-5).
- Turn the host computer system ON.
- Load the appropriate *Equinox SST Software Driver* in the host system.



Hint! If you have four or less modems, install them starting with slots 1, 5, 9 and 13. This will allow you to power off any modem without affecting the other modems.

This appendix describes the following power defaults and optional configurations for ISA, EISA and PCI *Adapter Cards*:

- *64-port Adapter Card* default power strap connections to obtain power for *Port Modules 1-4 (Ports 1-64)* from the host computer backplane.
- *128-port Adapter Card* default power strap connections to obtain power for *Port Modules 1-4 (ports 1-64)* from the host computer backplane and to obtain power for *Port Modules 5-8 (Ports 65-128)* from the computer power supply via J1.
- *128-port Adapter Card* power strap connections to optionally obtain power for *Port Modules 1-8 (Ports 1-128)* from the host computer backplane.



Equinox SST Expandable Adapter Cards ship from the factory with the power straps configured to provide power to the *Port Modules* via the *Host Bus Cable(s)*. Normally there is no need to reconfigure any of the power straps.

SST-64 Adapter Cards

All *SST-64 Adapter Cards* are setup to draw power for the host cable from the host computer system backplane. The power strap connections (default) shown in Figure A-1 select the backplane as the power source for *Port Modules 1-4 (Ports 1-64)*.

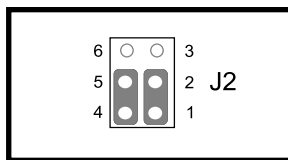


Figure A-1. SST-64 Adapter Card Power Strap Default Connections

SST-128 Adapter Cards

All *SST-128 Adapter Cards* are initially setup to draw power for the host cables from both the host computer motherboard and host computer power supply. The power straps (default) shown in Figure A-2 are configured to select these power sources.

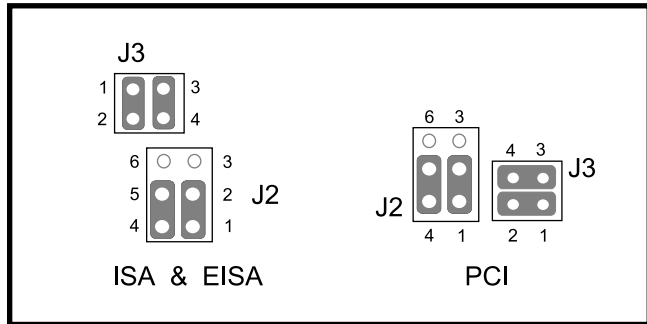


Figure A-2. SST-128 Adapter Card Power Strap Default Connections

The top *Host Cable Bus (Modules 5-8)* receives power from the host computer power supply via the host “Y” cable (J1-see Figure A-3). The bottom *Host Cable Bus (Modules 1-4)* receives power from the host computer motherboard.

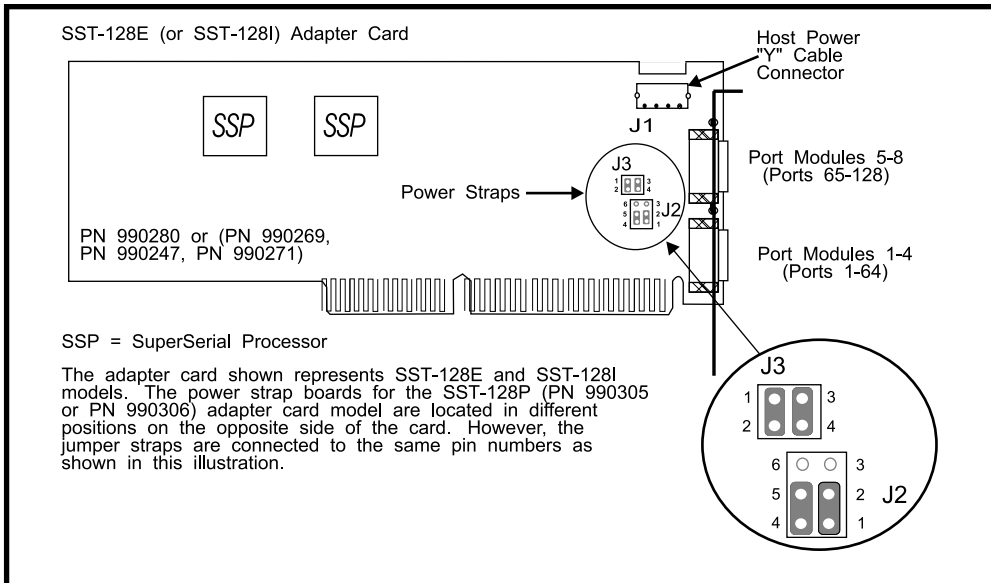


Figure A-3. EISA or ISA SST-128 Adapter Card Power Strap Default Connections

**Adapter Card Power
Option**

On *SST-128 Adapter Cards*, power for the top *Host Cable (Port Modules 5-8)* can be drawn from the host computer motherboard (instead of J1). To draw all port module power from the host computer motherboard, remove and set aside the host power cable connected to J1 and configure the power straps as shown in Figure A-4.

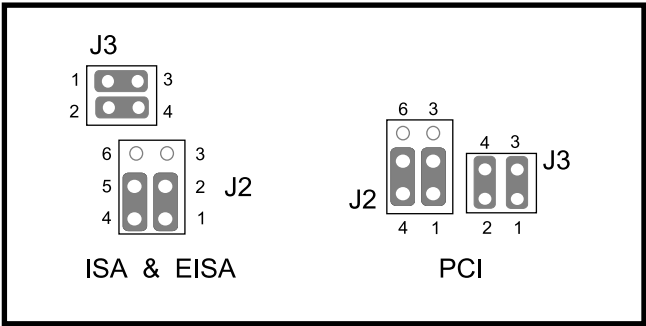


Figure A-4. SST-128 Adapter Card Power Strap Connections To Obtain Power For Port Modules 1-8 From The Host Computer Backplane

Technical Support Procedures

Equinox has made every effort to ensure that your *SST™ products* are of top quality in all respects. If you have a problem with any of your components, please follow these steps:

1. Read the appropriate hardware and software manuals and any release notes which describe the procedure you are trying to perform.
2. Check the *Equinox* Bulletin Board or www.equinox.com. To access the board, call (954) 746-0282 with any speed modem using N-8-1 as the communications parameters.
3. Contact the distributor from whom you purchased the board. *Equinox* authorized distributors are fully trained on *SST™* products and are authorized to handle technical support, service, returns and warranty claims.
4. If you still need assistance after calling your distributor or other point of purchase, call ***Equinox Technical Support*** at (954) 746-9000. You can also send problem reports, bugs and questions to our *fax number: (954) 746-9101* or *email address: support@equinox.com*. Please have the following information available when you place your call:

Board Type:

Serial Number:

Date of Purchase:

Place of Purchase:

Operating System:

Operating System Version:

Device Driver Version:

Computer Make & Model:

Other Boards in Machine:

Description of Problem:

Documentation Support Procedures

At *Equinox* we are always striving to make our product manuals accurate and easy to read. If you have an improvement to suggest or find an error in this manual please let us know.

Manual

Equinox SuperSerial™ Technology Hardware Installation & Reference Manual for Expandable I/O Subsystem (560075/G)

Operating System/Version

Driver Version

Problem

Solution

What could be added or changed to make the manual better?

Company: _____

Your Name: _____

Your Title: _____

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SEND TO:

Equinox Systems Inc.
ATTN: Customer Service
One Equinox Way - Sunrise, FL 33351
Phone: 954-746-9000 - Fax: 954-746-9101

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